The Recent Decline in Employment Dynamics

Henry R. Hyatt
Center for Economic Studies
US Census Bureau
Henry.R.Hyatt@census.gov

James R. Spletzer
Center for Economic Studies
US Census Bureau
James.R.Spletzer@census.gov

February 14, 2013

Any opinions and conclusions expressed herein are those of the authors and do not necessarily represent the views of the U.S. Census Bureau. All results have been reviewed to ensure that no confidential information is disclosed. We are very grateful to Bruce Fallick for providing us with tabulations by demographics and industry from the CPS gross flows series. We thank J. David Brown, Fariha Kamal, David Card, Leland Crane, Steve Davis, Bruce Fallick, Lucia Foster, John Haltiwanger, Kristin McCue, Erika McEntarfer, Hiroaki Miyamoto, Lars Vilhuber, and participants at various conferences and seminars for helpful comments and suggestions.

Abstract

In recent years, the rate at which workers and businesses exchange jobs has declined in the United States. Between 1998 and 2010, rates of job creation, job destruction, hiring, and separation declined dramatically, and the rate of job-to-job flows fell by about half. Little is known about the nature and extent of these changes, and even less about their causes and implications. In this paper, we document and attempt to explain the recent decline in employment dynamics. Our empirical work relies on the four leading datasets of quarterly employment dynamics in the United States – the Longitudinal Employer-Household Dynamics (LEHD), the Business Employment Dynamics (BED), the Job Openings and Labor Turnover Survey (JOLTS), and the Current Population Survey (CPS). We find that changes in the composition of the labor force and of employers explain relatively little of the decline. Exploiting some identities that relate the different measures to each other, we find that job creation and destruction could explain as much of a third of the decline in hires and separations, while job-to-job flows may explain more of the decline. We end our paper with a discussion of different possible explanations and their relative merits.

I. Introduction

In recent years, the rate at which workers and businesses exchange jobs has declined in the United States. This decrease in employment dynamics, particularly during the recessions of 2001 and 2007-2009, is immediately apparent in the data series on gross job flows (job creation and job destruction), gross worker flows (hires and separations), and job-to-job flows that have become available since the early 2000s.[1] Little is known about the nature and extent of these declines, and even less about their causes and implications.

Employment dynamics in the United States exhibit double-digit declines during the first decade of the twenty-first century, by any measure and from any data source. We summarize these declines in Table 1 (we describe the data in the next section).[2] While the levels of each measure differ across data sources due to a variety of definitional and scope differences, there is a strong agreement in the trend for each measure. Between 1998 and 2010, hires and separations rates fell between 10 percent and 38 percent, depending upon the data source. Job creation and job destruction rates declined by roughly 22 to 33 percent. Job-to-job flows exhibited the largest decline, falling by 47 to 53 percent. Available evidence suggests that the 1998-2010 decline in

[1] Declines in job creation and job destruction have been noted by Davis, Faberman, and Haltiwanger (2006), Davis et al. (2007), Konigsberg, Spletzer, and Talan (2009), Davis et al. (2010a), Haltiwanger, Jarmin, and Miranda (2011), Davis, Faberman, and Haltiwanger (2012) and Decker et al. (2012). A decline in gross worker flows has been noted by Abowd and Vilhuber (2011) and Lazear and Spletzer (2012), as well as in in the synthetic series of Davis, Faberman and Haltiwanger (2012). The decline in job-to-job flows has been noted by Bjelland et al. (2011) and Hyatt and McEntarfer (2012a, 2012b). Of these, Decker et al. (2012) is the only thorough attempt to explain the decline in an employment dynamics series, in their case, the annual job creation and destruction rates from the Business Dynamics Statistics.

[2] Table 1 documents the decline from 1998 to 2010, which are at different points of the business cycle. However, we will show later that most measures of employment dynamics fall during recessions and are relatively constant during the expansion of 2001 to 2007, as well as during the years immediately preceding the 2001 recession and following the 2007-2009 recession. Of course, we lack data on the full course of the economic expansion that began in 2009.

employment dynamics is an acceleration of a downward trend in employment dynamics that extend backwards in time before the start of our data series.[3]

Employment dynamics are important. Increases in job and worker reallocation have been associated with higher economic growth by, among others, Jovanovic and Moffitt (1990), Foster, Haltiwanger, and Krizan (2001), and Lentz and Mortensen (2008). This positive association comes through the Schumpeterian creative destruction process of new and expanding businesses replacing the market share of established companies, as well as the ongoing efforts of businesses and workers seeking their most productive matches. There is also strong evidence that job switching is an important component of wage growth, particularly for young persons -- see Topel and Ward (1992). If the decline in employment dynamics is indicative of declining innovation or declining labor market flexibility, then this would be worrisome for the U.S. economy. On the other hand, declining dynamics could be indicative of increased job stability or reduced uncertainty.

There are numerous potential explanations for the recent decline in employment dynamics. One set of explanations concern the changes in the composition of the employed or of employers. For example, the postwar baby boom generation is aging and the employment-to-population ratio of teenagers has been falling: both of these changes should lead to reduced dynamics as the workforce shifts from subpopulations with high rates of mobility to subpopulations with low rates of mobility. Other possible explanations include declining worker

[3] Davis, Faberman, and Haltiwanger (2006) show a long-term fall in manufacturing job flows dating back to the early 1960s, and Davis et al. (2010a) show annual private-sector job flow rates trending downward during the 1977 to 2005 time period (noting their data series starts in 1977). Decker et al. (2012) note that the downward trend in gross job flows has accelerated in the post-2000 time period. Davis (2008) summarizes evidence from multiple sources that all point to secular declines in the risk of job loss that extend back in time several decades.

mobility resulting from better initial worker-firm matching, a shift in the distribution of outside wage offers, increased mobility costs or employment adjustment costs, or the globalization of the production process. In this paper, we give the range of explanations our critical consideration.

We begin this paper by thoroughly documenting the decline in employment dynamics.[4] Our empirical work relies on the four leading datasets of quarterly employment dynamics in the United States – the Longitudinal Employer-Household Dynamics (LEHD), the Business Employment Dynamics (BED), the Job Openings and Labor Turnover Survey (JOLTS), and the Current Population Survey (CPS). In section III, we examine changes in labor market composition as an explanation for these declines; our analysis shows that changes in the composition of workers and businesses can explain only a small amount of the decline in employment dynamics.[5]

In section IV, we further analyze the decline in gross worker flows (hires and separations), employing some helpful identities that relate gross worker flows to gross job flows (job creation and destruction), as well as to job-to-job flows. We find that the decline in gross job flows can be described as a narrowing of the distribution of employer growth rates, but this change in the distribution of gross job flows only explains about a third of the decline in gross

[4] We define employment dynamics as gross worker flows, gross job flows, and job-to-job flows. We exclude employment inflows and outflows, as well as churn, from our basic analysis of employment dynamics. Employment inflows, employment outflows, and churn can be derived from the components of job flows, worker flows, and job-to-job flows through simple addition and subtraction. We document trends in these other series in Section IV. Also note that we do not discuss the trends of unemployment dynamics in this paper.

[5] This finding is similar to several recent studies of declining dynamics in other domains. Kaplan and Schulhofer-Wohl (2012) find that changes in the demographic, industry, and occupation composition explain little if any of the 1991-2011 decline in interstate migration, Fujita (2012) finds that the aging of the labor force explains roughly one-half of the decline in the job separation rate (defined as the EU gross flow in the CPS) that has occurred during the last three decades, whereas changes in the industry composition explain essentially none of the decline. Moscarini and Thomsson (2007) document an increase in occupational mobility from the late 1970s to the mid-1990s which is consistent with the findings of Kambourov and Manovskii (2008), followed by a decline after 1994, but they do not conduct a composition analysis.

worker flows. This implies that whatever economic forces are driving the declines in gross job flows, there are other independent forces that are driving the declines in gross worker flows. Analyzing the relationship between gross worker flows and job-to-job flows, we find that declines in both short-duration jobs and job-to-job flows are driving the declines in gross worker flows.

We end this paper with a discussion of additional explanations for the decline in labor market dynamics, including increases in adjustment costs, changes in the job matching process, the role of uncertainty, changes in the production process, and job- and housing-lock. While we are able to rule out some explanations, we do not conduct any formal tests, and we view our discussion as an aid for future research.

II. Empirical Measures of Employment Dynamics

Hires are the count of new employer-employee matches. These flows include individuals changing jobs, individuals moving from non-employment to employment, and additional jobs started while staying at a current employer. Hires are sometimes referred to as accessions. Separations are ending employer-employee matches. These flows include individuals who change jobs, individuals who move from employment to non-employment, and people who leave a job while employed at another employer. Monthly estimates of hires and separations are published by the JOLTS program at the U.S. Bureau of Labor Statistics (BLS), and quarterly estimates of hires and separations are part of the Quarterly Workforce Indicators (QWI) published by the LEHD program at the U.S. Census Bureau. Hires and separations can also be

measured using the CPS microdata, which is collected as a joint effort between the BLS and the Census Bureau.

Job creation and job destruction measure the net employment change at the level of the business establishment, or workplace. Job creation is the net employment change summed across establishments with hires greater than separations, and job destruction is the (absolute value of) net employment change summed across establishments with separations greater than hires. Quarterly estimates of job creation and job destruction are published by the BED program at the BLS, as well as by the LEHD program's QWIs. Annual estimates of job creation and job destruction are published by the Business Dynamics Statistics program at the Census Bureau.

Empirical analysis of hires, separations, job creation, and job destruction in a unified framework has blossomed during the past several years due to the creation of longitudinally linked employer datasets. Examples of this literature using U.S. data are Burgess, Lane, and Stevens (2000), Abowd and Vilhuber (2011), Davis, Faberman, and Haltiwanger (2012), and Lazear and Spletzer (2012). We add to this literature by incorporating one more measure of employment dynamics into the analysis. Job-to-job flows are the count of individuals observed moving from one employer to another with no intervening spell of non-employment. Job-to-job flows have been empirically analyzed by Fallick and Fleischman (2004), Bjelland et.al. (2011), and Hyatt and McEntarfer (2012a, 2012b).

We use data from four sources: the LEHD, the BED, the JOLTS, and the CPS. Wherever possible in our analysis that follows, we use publicly available data, with the exception of job-to-

job flows tabulations constructed from the confidential LEHD microdata. We report data from each of our four sources on a quarterly frequency, seasonally adjusted, as rates.[6] The subsections below contain short descriptions of the four datasets. An overview of the employment dynamics series available from each of the four data sources is provided in Table 2.

IIa. Longitudinal Employer-Household Dynamics (LEHD)

The LEHD is a longitudinally linked employer-employee dataset created by the U.S. Census Bureau as part of the Local Employment Dynamics federal-state partnership. The data are derived from state-submitted Unemployment Insurance (UI) wage records and the Quarterly Census of Employment and Wages (QCEW) data. Every quarter, employers who are subject to state UI laws – approximately 98% of all private sector employers, plus state and local governments – are required to submit to the states information on their workers (the wage records) and their workplaces (the QCEW). The wage records and the QCEW data submitted by the states to the U.S. Census Bureau are enhanced with census and survey microdata in order to incorporate information about worker demographics (age, gender, race and ethnicity, and education) and the firm (firm age and firm size). Abowd et al. (2009) provide a thorough description of the source data and the methodology underlying the LEHD data and one of its main public use data products, the QWI.

[6] We omit the Business Dynamics Statistics (BDS) from our core analysis because its data are annual whereas all others can be analyzed on a quarterly frequency. The BDS also shows a declining trend in job creation and job destruction in the time period we consider; this declining trend is thoroughly analyzed by Decker et al. (2012) using the underlying confidential microdata.

We use quarterly measures of hires, separations, job creation, and job destruction assembled from the QWI and made available at the Cornell Virtual RDC. Because states have joined the LEHD program at different times, and have provided various amounts of historical data upon joining the LEHD program, the length of the time series of LEHD data varies by state. We have downloaded, from the Cornell Virtual RDC, private sector QWI data from the 30 states that have data available from 1998:Q2 through 2010:Q4. These 30 states account for about 65 percent of national employment.[7] In this paper, we use the acronym "LEHD" when we refer to QWI data downloaded from the Cornell Virtual RDC, as well as the job-to-job flows created using LEHD microdata, as described below.

Hyatt and McEntarfer (2012a, 2012b) have created job-to-job flow statistics from the confidential LEHD microdata that measure movements between dominant jobs, where the dominant job is defined as the job with the highest earnings in the quarter. The Hyatt and McEntarfer job-to-job flow statistics are computed from a sample of individuals who ever worked in at least one of nine states, and their employment histories are tracked through all available states. Movements into and out of state and local (but not federal) government jobs are included in the job-to-job flow series.[8] We use the Hyatt and McEntarfer data in this paper; a public-use job-to-job flows data product is under development at the time of this writing.

[7] Our estimates of the magnitude of the decline in employment dynamics are essentially unaffected when we use the national series of LEHD hires, separations, job creation, and job destruction constructed by Abowd and Vilhuber (2011).

[8] As seen in Table 2, the gross worker and job flows that we use from the LEHD exclude government, whereas the job-to-job flows from the LEHD include state and local government. Similarly, the BED and JOLTS data that we use exclude government, whereas the CPS gross flows that we use include state, local, and federal government. We include government jobs in the LEHD job-to-job flows and in the CPS gross flows because these data are easily available to researchers. Empirical results, using available data, show that the double-digit percentage declines in employment dynamics measured over the past 10 to 15 years are unaffected by the inclusion or exclusion of government jobs.

IIb. Business Employment Dynamics (BED)

The BED statistics on job creation and job destruction are available from the BLS website. The BED data are constructed by longitudinally linking the establishment-level QCEW microdata provided by the states (the same establishment-level data used in the creation of the LEHD data). The BED time series begins in 1992:Q3.

IIc. Job Openings and Labor Turnover Survey

The JOLTS statistics on hires and separations are available from the BLS website. The JOLTS data are constructed from a monthly survey of 16,000 establishments (the JOLTS survey form is at http://stats.bls.gov/jlt/jltc1.pdf). The JOLTS monthly data are available from December 2000 to the present. We create quarterly data from the monthly JOLTS data, with a time series that begins in 2001:Q1.

IId. Current Population Survey

The CPS is the workhorse data of labor economics research, with monthly information on labor force status (employed, unemployed, or not in the labor force) by a variety of demographic characteristics. CPS statistics are available from 1948 to the present on the BLS website. We use the CPS data to construct estimates of job-to-job flows, hires, and separations.

Fallick and Fleischman (2004) have utilized the CPS microdata to calculate monthly job-to-job flow statistics. They exploit the 1994 CPS questionnaire redesign, which replaced the paper and pencil questionnaire with computer assisted interviewing. Computer assisted interviewing allows information from the previous month's interview to be available to the interviewer. Specifically, one of the dependent interview questions in the redesigned CPS is, for those persons who are employed in both the previous and the current month, "Do you still work for [COMPANY NAME]?" The intent of this question is to improve industry and occupation coding in the CPS, but it is also a direct measure of job-to-job change. The resulting job change data have been analyzed by Fallick & Fleischman (2004). Fallick and Fleischman have made their monthly data from January 1994 through June 2012 available to other researchers (online at http://www.federalreserve.gov/pubs/feds/2004/200434/200434abs.html). Data for several months in 1995 are missing, and thus we are able to create quarterly time series of job-to-job flows that begin in 1995:Q4.[9]

The BLS produces estimates of gross flows – the monthly transitions amongst the three labor force states of employed, unemployed, and not in the labor force. The CPS gross flows are described at http://www.bls.gov/cps/cps_flows.htm. The CPS gross flows have been widely used to understand unemployment dynamics across the business cycle – see, for example, Elsby, Michaels, and Solon (2009), Barnichon and Nekarda (2012), and Shimer (2012). Using CPS terminology of UE to represent flows from unemployment to employment and NE to represent flows from not in the labor force to employment, hires are created as (UE + NE + job-to-job

[9] Bruce Fallick of the Federal Reserve has created and kindly provided to us estimates of CPS job-to-job flows and CPS gross flows by gender, age, education, and industry. We are very grateful to him for these data.

flows). Similarly, separations are created as (EU + EN + job-to-job flows). We use the Fallick and Fleischman monthly data to create quarterly measures of hires and separations from the CPS.

III. The Effect of Composition Changes on the Decline in Employment Dynamics

We now turn to a decomposition of the decline in employment dynamics for each measure and data source under consideration. The basic question we seek to answer is, "how much of the decline is due to the changing composition of individuals or businesses?" For example, as the baby boom has been aging during the last 15 years, the share of employment of workers aged 25-44 has been declining (from 53.1 percent in 1998:Q2 to 43.9 percent in 2010:Q4), while the employment share of workers aged 45-64 has been increasing (from 27.5 percent in 1998:Q2 to 37.0 percent in 2010:Q4). Because the hires and separations rate are essentially monotonically declining in age, the aging of the workforce will lead to declining hires and separations rates.

We measure the effect of composition changes using a standard decomposition technique to separate between-group differences from trends within groups for any employment dynamics measure Y, as follows. Any measure of employment dynamics Y_t can be written as $\Sigma_i Y_{it} S_{it}$, where i indexes groups of the workforce or businesses (such as worker age or firm size), and S_i is the share of the group. We decompose the difference $\Delta Y_t = Y_t - Y_{t-1}$ according to

$$\Delta Y_t = \Sigma_i \Delta Y_{it} S_{i\cdot} + \Sigma_i Y_{i\cdot} \Delta S_{it},$$

where $Y_{i\bullet}$ denotes the mean such that $Y_{i\bullet}=(Y_{it}+Y_{it-1})/2$, and likewise $S_{i\bullet}$. In words, the decline in employment dynamics is equal to the change in the dynamics of each group weighted by the group's average employment share (the "within" effect) plus the change in each group's employment share weighted by the group's average measure of dynamics (the "composition" effect).

Before we present the results from the decomposition, it is worthwhile to consider how the compositional changes of the U.S. labor market between the late 1990s and 2010 may affect the level of employment dynamics in the U.S. economy.[10] As mentioned above, the aging of the U.S. workforce is expected to reduce employment dynamics in the economy. The proportion of the U.S. labor force that has a Bachelor's degree has been increasing, and workers with college degrees tend to have more stable employment than workers without college degrees. The share of workers at small businesses has declined, which should also lead to lower employment dynamics. Furthermore, the share of employment that is in construction has declined after the housing bust of 2006, and that sector of the economy tends to have high rates of employment dynamics. However, this is offset by declining employment in manufacturing, which tends to have low rates of employment dynamics.

[10] The way we measure composition changes ignores changes to the labor force that might occur within particular subgroups, such as the increasing take-up of Social Security Disability Insurance among those nearing retirement age, the increase in incarceration rates among young black males, and changes in the frequency of undocumented migrants working in the U.S.

IIIa. Hires and Separations

Figure 1 presents the seasonally adjusted rates of hires and separations in three data sources: the LEHD, the JOLTS, and the CPS. The levels of hires and separations are clearly different across data sources, but this is not a serious concern. There is evidence that the LEHD has more short-duration jobs than does the CPS[11], and this would lead to higher LEHD hires and separations rates. There is also evidence that the JOLTS misses establishments with large amounts of dynamics (see Davis et al. 2010b), which would lead to lower JOLTS hires and separations rates. More importantly, we see declining rates of hires and separations in all three datasets, albeit varying amounts of decline. The LEHD hires and separations decline by 38 and 36 percent, respectively, during the 2001:Q1 to 2010:Q4 time period, the JOLTS measures decline by 29 to 35 and the CPS measures decline by 14 and 18 percent, respectively.[12] These declines are not sensitive to the endpoints of the time period; declines are obvious in Figure 1 from any point in the late 1990s (excepting the JOLTS, which starts in 2001:Q1) to any point in the late 2000s.

The decline in hires and separations from all three data sources shows a "stair-step" pattern, with declines concentrated in or around recessions, from which the measures never fully recover during expansions. Using NBER recession dates, all of the 8.9 percentage point decline in LEHD hires (from 2001:Q1 – 2010:Q4) occurs during the 2001 and the 2007-2009 recessions, and 6.3 percentage points of the 8.1 percentage point decline in LEHD separations occurs during the recessionary quarters. Similarly, more than all of the decline in JOLTS hires occurs during

[11] See Abraham et al. (Forthcoming).
[12] Throughout this paper, we calculate proportionate changes as (B-A)/((A+B)/2).

recessions, and half of the decline in JOLTS separations occurs during recessions. The CPS series is somewhat different: as seen in Figure 1, much of the decline in CPS hires and separations occurs in 2002, immediately following the 2001 recession, and in 2007, immediately preceding the 2007-2009 recession.

The top rows of Table 3 document the 2001:Q1 – 2010:Q4 decline in hires and separations from the three data sources. The decomposition results in the middle of the table show that changes in the age distribution towards older workers explain 13 and 11 percent, respectively, of the decline in hires and separations in the LEHD, and 23 and 15 percent of the decline in the CPS. It is not surprising to find essentially no effects for gender, given there have been only small changes in the gender composition of the workforce during the 2001 – 2010 time period and the differences in employment dynamics by gender are small. Although there have been noticeable changes in the race and ethnicity composition of the workforce between 2001 and 2010 (the employment share of Asians has increased from 5.1 percent to 6.2 percent, the employment share of Hispanics has increased from 13.5 percent to 15.8 percent, and the employment share of Whites has decreased from 68.2 percent to 64.7 percent), the total composition effect of race and ethnicity on declining employment dynamics is negligible, and actually goes the wrong way.

Each of the decompositions for age, gender, and race and ethnicity in Table 3 (and in all other tables) are separate decompositions. For two reasons, we have chosen not to conduct a decomposition with interactions of the demographic characteristics. First, every decomposition in Table 3 (and Table 4, as well as the decompositions using CPS data in Table 5) is done from

public-use data, and the public-use data do not contain any interactions. Second, the results in Decker et.al. (2012) suggest that fully interacted decompositions are roughly cumulative; this implies that the small gender effect and the negative race and ethnicity effect would explain less of the declining dynamics than just age alone.

The CPS shows that changes in the education distribution explain about a quarter of the decline in hires and separations, whereas the education results in the LEHD data are essentially zero. We believe that the LEHD's counter-intuitive finding is an artifact of how the education data in the LEHD are created, rather than a true economic result. Educational information is not part of the UI wage records, but is obtained from a link to the long form of the 2000 Decennial Census. Since the long form is only asked for 1 of 6 households, the overwhelming majority of individuals in the 2000 LEHD have their education imputed. But more importantly, the LEHD uses the Census 2000 long-form responses for the population age 25 and over as the sampling distribution for the education of all other workers, and allows no variation over time in any worker's educational attainment. As a result, the time series of employment shares by education in the LEHD do not show nearly as much of a trend toward bachelor's degree attainment as does the CPS, and this lack of time series variation leads to LEHD's zero effect from composition changes in education in Table 3.[13]

We see in the bottom of Table 3 that employer characteristics such as industry and the size of the business explain relatively little of the decline in hires and separations. In all three datasets, the LEHD, the JOLTS, and the CPS, changes in industry composition lead to higher employment dynamics. Much of this is due to the shift in employment from manufacturing to

[13] We have informed the LEHD program of our results.

healthcare and accommodation and food services. Of the various employer characteristics, the shift in the firm age distribution toward older firms has the largest effect, explaining roughly 8 percent of the decline in hires and separations.[14]

IIIb. Job Creation and Job Destruction

Quarterly measures of job creation and job destruction are available from the LEHD and the BED. Figure 2 presents the seasonally adjusted time series for these measures. Again, we see a clear decline in the rates of job creation and destruction between the 1990s and the 2000s, although the countercyclical nature of job destruction leads to less of a "stair-step" pattern around recessions than is seen for hires, separations, and job creation. Table 4 presents the decompositions by employer characteristics (industry, firm size, and firm age). Similar to the results in Table 3, the changing composition of industrial employment goes the wrong way in that it predicts rising rates of job creation and job destruction. The changing composition of firm size, towards larger firms, explains 10 and 13 percent, respectively, of the decline in LEHD job creation and job destruction, and about 6 percent of the decline in each of the corresponding BED measures. The changing composition by firm age again has the largest estimated magnitude, explaining 19 percent of the decline in job creation and 14 percent of the decline in job destruction.

[14] The share of employment in firms aged 0-1 years has fallen by 1.9 percent over the 1998:Q2 to 2010:Q4 time period, and the share of employment in firms aged 2-3 years has fallen by 1.3 percent. The share of employment in firms more than 10 years of age has increased by 4.5 percent. Hires and separations are declining in magnitude with the age of the firm.

IIIc. Job-to-Job Flows

Job-to-job flows can be calculated from two datasets – the LEHD and the CPS. Figure 3 presents the two seasonally adjusted quarterly time series.[15] We see, similar to the other series, that much of the decline in job-to-job flows occurs during recessions, and that during the expansion between 2001 and 2007 job-to-job flow rates never recover to the level seen during the 1990s. Using NBER recession dates, more than all of the 3.8 percentage point decline in the LEHD measure occurs during recessions, and 2.0 percentage points of the 3.3 percentage point decline in the CPS measure occurs during recessions.

The decomposition results for job-to-job flows are presented in Table 5. Changes in demographic and business composition do very little to explain the decline in job-to-job flow rates. Of any characteristic, only worker age and firm age explains more than a few percent of the decline in job-to-job flow rates. Education explains a small amount (2.9%) in the right direction of the trend in the CPS data, but explains almost none of the decline in the LEHD series, although as we discussed above this latter result is undoubtedly due to the way the LEHD education series is constructed.

[15] Again, we are not concerned about the difference in levels. We believe that the LEHD job-to-job measure is higher than the CPS measure because of measurement. As noted above, Abraham et al. (Forthcoming) document that the LEHD has more short-duration jobs than does the CPS, and this would lead to higher LEHD job-to-job flow rates.

IV. Additional Aspects of the Decline

The data presented in the previous section shows overwhelming evidence that measures of employment dynamics (hires, separations, job creation, job destruction, and job-to-job flows) have declined during the 1998-2010 time period. These declines occur in all datasets in which we measure quarterly employment dynamics. Furthermore, we have shown that the changing composition of any worker characteristic or business characteristic during the time period can explain at most a quarter of the decline. In this section, we explore the identities between the measures of employment dynamics to better understand the nature of the decline.

IVa. Gross Worker Flows and Gross Job Flows

Hires and separations are the necessary consequence of both job creation and job destruction, as well as job-to-job flows. Each expanding employer necessarily must hire at least as many workers as required for their employment count to increase, although they often hire more employees in order to replace workers who separate. Similarly, contracting employers often have more separations than the size of the contraction, since hires also occur in contractions. The difference between hires and job creation is called churn, which is also the difference between separations and job destruction. This can be written as:

Hires + Separations = Job Creation + Job Destruction + 2*Churn

In this identity, job creation and job destruction measure the reallocation of jobs across businesses or the "between establishment" employment reallocations, while churn measures the "within-establishment" reallocation of hires and separations.

This identity provides a natural starting point for explaining how the decline in gross worker flows is related to the decline in gross job flows. We are able to consistently estimate this equation using the LEHD summary statistics in Table 1. Estimates are provided in Table 6. We find that 20 percent of the decline in hires and separations from 1998:Q2 to 2010:Q4 is associated with the decline in job creation and job destruction rather than the decline in churn. This 20 percent estimate is not sensitive to the particular end points we use. Lazear and Spletzer (2012) confirm the relative declines in worker flows and job flows using research tabulations from the JOLTS microdata. We show a similar accounting exercise in Table 7 using the Lazear and Spletzer data, and report that more than 90 percent of the decline in worker flows is accounted for by churn, and less than 10 percent by job creation and destruction.

Because the relationship between gross worker flows and gross job flows is highly nonlinear, this simple decomposition may not be the appropriate method of accounting for the relationship between the two. To address this possible concern, we estimate the basic compositional analysis above with another characteristic of employers: the employer's growth rate. We use the growth measure "g" defined by Davis, Haltiwanger, and Schuh (1996), where E is employment and $g_t=(E_t-E_{t-1})/[(E_t+E_{t-1})/2]$. We create 55 growth rate bins: one bin for deaths ($g_t=-2$), 26 bins of various sizes for contractions ($-2<g_t<0$), one bin for no growth ($g_t=0$), 26 bins

of various sizes for expansions ($0<g_t<2$), and one bin for births ($g_t=2$). The exact bins we use are given in the footnotes to Table 8.

Table 8 contains the results for the decomposition of employment dynamics using the establishment growth rates in the LEHD data, and here we are computing estimates from the confidential LEHD microdata rather than using publicly available data. To interpret the results in the table, it is helpful to review the decomposition, $\Delta Y_t = \Sigma_g \Delta Y_{gt} S_g + \Sigma_g Y_g \Delta S_{gt}$, where g is the establishment's growth rate and S_g is the employment share in the g^{th} interval. If Y refers to job creation or job destruction and if g were defined very precisely as exact point estimates, then ΔY_{gt} would be zero by definition and 100% of the decline in job creation and job destruction would be attributable to changes in employment shares across the establishment growth rate distribution (ΔS_{gt}). We use 55 bins rather than exact point estimates, yet our estimates of the composition effect for job creation and job destruction in Table 8 are essentially 100% (99.8% for job creation and 100.3% for job destruction).

Although this 100% estimate of the composition effect in the job creation and job destruction decompositions is a mechanical result, it is interesting to examine how the changing employment shares lead to declining job creation and job destruction rates. This is done in Figure 4, where we plot the difference between the 1998:Q2 employment share and the 2010:Q4 employment share for each of the 55 establishment growth rates. It is immediately obvious that the establishment growth rate distribution is narrowing. Comparing 2010:Q4 to 1998:Q2, there is less employment in establishments with large expansions and births (g>.03) and less

employment in establishments with large contractions or deaths (g<-.06).[16] Figure 4 also shows that there is more employment in establishments with no change in employment: this share rises from 11.9 percent in 1998:Q2 to 14.6 percent in 2010:Q4.

The data in Figure 4 is non-symmetric around zero. We believe that this is due to the change in the business cycle when comparing 1998:Q2 to 2010:Q4. We have re-created Figure 4 for comparable points in the business cycle, such as 2000:Q4 and 2007:Q4, which are quarters near the end of expansions, as well as 2003:Q3 and 2010:Q3, which are quarters when the labor market is beginning to show positive growth. The changing employment share distributions in these quarters are much more symmetrical than the 1998:Q2 to 2010:Q4 change distribution, yet all these comparisons show a narrowing distribution with more employment in the zero change interval and more employment in establishments with small amounts of creation and destruction.

The bottom line from Table 8 and Figure 4 is that job creation and job destruction rates are declining over time because [a] more employment is in establishments with zero growth, and [b] the distribution of establishment growth rates is narrowing -- shifting away from establishments with moderate and large changes in employment to establishments with small changes in employment. This is similar to the findings of Konigsberg, Spletzer, and Talan (2009). We also note that this is a mechanical result, and the results from the composition analysis in the previous section highlight that we don't yet know the economic forces driving the narrowing distribution.

[16] The establishment growth rate g is related to the conventional growth rate G via the equation G=2g/(2-g), where G is defined as $G=(E_t-E_{t-1})/E_{t-1}$. Thus g=.03 corresponds to G=.03 and g=-.06 corresponds to G=-.06.

We now ask how much of the decline in hires and separations can be explained by the narrowing establishment growth rate distribution. Intuitively, we can answer this question by examining the decomposition $\Delta Y_t = \Sigma_g \Delta Y_{gt} S_g + \Sigma_g Y_g \Delta S_{gt}$, where "Y" now refers to hires or separations. If the narrowing establishment growth rate distribution were to explain 100% of the decline in hires and separations, we would need ΔY_{gt} to be zero for every growth interval. This says that the hires and separations rates within growth intervals do not change over time, which can be examined visually.

Figure 5 shows the hires and separations rates for each employment growth interval "g." This is the familiar "hockey-stick" graph popularized by Davis, Faberman, and Haltiwanger (2006, 2012). The graph in the top panel of Figure 5 shows the full distribution from g=[-2,2], and the graph in the bottom panel restricts to g=[-0.4,0.4]; 95 percent of employment is in establishments who grow or decline in the range of g=[-0.4,0.4]. The two graphs show the hires and separations rates for 1998:Q2 (the solid black and grey lines) and for 2010:Q4 (the dotted black and grey lines). It is immediately obvious that the hires and separations rates are declining within every growth interval.[17]

Turning back to the decomposition, we report the results for hires and separations in Table 8. The narrowing establishment growth rate distribution, which explains 100 percent of the decline in the job creation and job destruction rates, explains 37.3 percent of the declining hires rate and 32.0 percent of the declining separations rate. This tells us that in addition to factors that might explain net changes in establishment-level employment, such as adjustment

[17] Graphs which show the hires and separations rates at quarters at the same point in the business cycle (rather than showing 1998:Q2 and 2010:Q4) are visually identical to Figure 5.

costs or changes in production processes, there must be additional factors that explain changes in gross worker flows independent of changes in gross job flows. Our composition analysis in the previous section illustrates that we don't yet know the underlying factors.

IVb. Gross Worker Flows and Job-to-Job Flows

The previous subsection examined the identity linking gross worker flows and gross job flows. Another identity amongst the employment dynamics measures we analyze is that linking gross workers flows and job-to-job flows. In the simplest conceptual model, hires are defined as the sum of job-to-job flows plus employment inflows, and separations are defined as the sum of job-to-job flows plus employment outflows. This leads to:

$$\text{Hires} + \text{Separations} = \text{Employment Inflows} + \text{Employment Outflows} + 2*\text{Job-to-Job Flows}$$

In this identity, employment inflows and outflows measure the reallocation of jobs across the labor force states of employed and not-employed, while job-to-job flows measures the "within-employment" reallocation of hires and separations.

We can estimate this equation directly with the CPS summary statistics in Table 1. Estimates are in Table 9. We find that 165 percent of the decline in hires and separations is associated with the decline in job-to-job flows, rather than trends in flows into and out of employment. The negative contribution of employment inflows and outflows reflects the

increasing trend in these series in the CPS data between 1998:Q2 and 2010:Q4.[18] The estimates in Table 9 tell us that the decline in hires and separations in the CPS data is more than fully explained by the decline in job-to-job flows.

Estimating the identity above with the LEHD data is more complex than might initially appear. The CPS is a person-level dataset, with the most attention paid to the respondent's main job. The LEHD data, by contrast, tracks all jobs covered by Unemployment Insurance, including secondary jobs. Our measure of job-to-job flows from the LEHD is similar to the CPS, in that it measures flows across dominant jobs, whereas our measure of hires and separations from the LEHD records hires and separations from all jobs. This conceptual difference forces us to modify the identity above for use with the LEHD data:

Hires + Separations = Employment Inflows + Employment Outflows
+ 2*Job-to-Job Flows (dominant jobs)
+ Residual of Secondary and Short-Term Job Activity

Estimates of this equation using the LEHD data are in Table 10. The hires and separations measures, as well as the job-to-job flows across dominant jobs, are from Table 1; the estimates of employment inflows and outflows are from tabulations of the confidential LEHD microdata. We find that 12 percent of the decline in hires and separations is associated with a decline in employment inflows and outflows, 43.4 percent is associated with job-to-job flows across dominant jobs, and the rest (44.6 percent) is associated with declines in secondary or short-term job activity. While different from the point estimate using the CPS data (-65 percent

[18] Quarterly employment inflows in the CPS increase from 11.7 percent in the average quarter of 1996 to 12.5 percent in the average quarter of 2010, and quarterly employment outflows in the CPS increase from 11.4 percent in the average quarter of 1996 to 12.3 percent in the average quarter of 2010.

compared to 12 percent), the two datasets are telling the same story that flows into and out of employment are not the dominant explanation for the trend decline in hires and separations. Rather, the decline in hires and separations is driven by a decline in the job-to-job flow rates, and, in addition, the residual category of secondary and short-term jobs.

Returning to the estimates in Table 10, we see that the 88 percent estimate of all job-to-job flows puts about equal emphasis on flows between dominant jobs as on flows associated with secondary or short-term jobs. This importance of secondary and short-term jobs in accounting for the decline in gross worker flows warrants further attention. In Table 11, we decompose total hires into (i) hires into jobs that last one quarter, (ii) hires into jobs that last two quarters, and (iii) hires into jobs that last three or more quarters. We do the same for separations. At the top of Table 11, we see that in 1998:Q4, 40 percent of all hires (.114/.288) are into jobs that last only one quarter, and 37 percent of all hires (.107/.288) are into jobs that last three or more quarters. In 2010:Q3, the 40 percent short duration ratio falls to 32 percent, and the 37 percent ratio increases to 45 percent. Thus over twelve years, there has been a substantial decline in the importance of short-duration jobs. At the bottom of Table 11, we document that the decline of hires and separations into and out of short duration jobs is responsible for 52.7 percent of the decline in gross worker flows. This tells us that any explanation for the declining hires and separations rates will need to account for a decline in short-duration jobs.

V. Discussion

As stated in our introduction, there are many possible reasons for the recent decline in employment dynamics. Our empirical analysis above assessed several potential explanations. We showed that stories about changes in the composition of the U.S. labor market have limited capacity to explain this decline. We also showed that the decline in gross worker flows is only partially explained by the decline in gross job flows, and that declines in job-to-job flows and short term jobs must be part of any explanation for lower rates of hires and separations. In this section, we discuss strands of the economics literature that we think may provide potential avenues for addressing the source of declining dynamics.

As we describe below, there are fairly well developed models that include gross job flows as an outcome, and we can propose several different hypotheses about what may have occurred, including that there may be less uncertainty about a business's optimal size, that the mechanism for technological progress may have changed, or that the U.S. trade structure leads to idiosyncratic demand shocks now being addressed through import volatility. Our thoughts on why job-to-job flows have declined are somewhat more tentative, but we suggest the literature on job match quality as a starting point, as the declines in gross worker flows and job-to-job flows are concentrated in recessions.

Va. Employment Adjustment Costs

Labor market frictions naturally discourage the mobility of labor. Increases in the costs to the employer or employee (or both) of beginning or ending a job, or of changing jobs, will lead to declining employment dynamics. Empirical estimates of some of these costs have been surveyed recently by Manning (2011), especially employer costs of hiring such as posting a vacancy and training costs, as well as worker costs of conducting job search. For some particular hiring costs, increases are unlikely: for example, during the last two decades, expanding use of the internet for filling jobs has likely led to lower costs of posting vacancies, and similarly the costs of applying for vacancies has likely declined as well.[19]

Changes in the costs of training new workers to fill vacancies may have more potential as a hiring cost explanation for lower rates of hiring and separations. Numerous studies, recently surveyed by Acemoglu and Autor (2011), have documented that the U.S. labor market has shifted away from "middle skill" jobs. Replacement costs vary along the skill distribution, and it is more costly to hire and train high skill workers, as shown by Manning (2006) and Dube et. al. (2010), and so this polarization could lead to higher overall training costs. If, as in the model of Jaimovich and Siu (2012), when middle skill jobs disappear, firms fill high skill jobs with former occupants of middle skill jobs, then there may also be training costs associated with training workers without previous experience in a high skill job. This story suggests that employers could increase pay to their higher skilled workers to limit separations, which is consistent with

[19] Autor (2001) discusses how the internet lowers the cost of job search for both the employer and the worker. The resulting increase in the quality of the job match should reduce future separations. Autor also notes that reduced search costs makes it easier for both employers and workers to seek better job matches while employed, potentially inducing more separations. We are unaware of empirical data showing which effect dominates.

the recent increase in inequality. However, this story is not consistent with the data we analyzed in Tables 3 or 5, where educational attainment provides a somewhat coarse measure of skill. Further inspection of the data (not shown) indicates that the largest declines in employment dynamics, either on an absolute basis or a relative basis, occur amongst the least educated, while the most educated have a relatively small decline in their hires, separations, and job-to-job flow rates.

Similar to costs associated with hiring workers, there are costs associated with laying off or firing workers, which can involve severance payments, compliance with employment laws, or legal costs associated with the risk of lawsuits; see the recent review by MacLeod (2011). Models including Hopenhayn and Rogerson (1993) and Alvarez and Veracierto (2001) have considered the relationship between firing costs and employment dynamics. We think that it is unlikely that changes in these costs are a major factor contributing to declining dynamics. We know of no recent changes in the U.S. regarding increased severance payments to laid off workers. More generally, the main trend in the costs associated with employment separations in recent decades seems to be the continuing decline in unionization rates, which presumably makes employment separations less costly.

In addition to the direct costs associated with hiring and separations, there is also a well-developed literature on adjustment costs, including Hall (2004), Cooper, Haltiwanger, and Willis (2004), and Bloom (2009), which tends to focus on the indirect costs associated with changes in employment levels. In addition to the costs associated with hiring, firing, and laying off workers, as discussed above, organizational and other costs associated with expanding or

contracting an establishment's workforce matter when considering the costs associated with changes in employment levels. For example, when an establishment doubles its staff, there may be new managerial challenges that result in a deviation from an establishment's long run maximum profitability. Changing an establishment's overall staff may also be associated with certain building or capital costs.[20] While we find it more difficult to speculate on changes in these organizational or technological aspects of adjustment costs, we believe that adjustment cost models might help explain the decline in employment dynamics. We think a fruitful avenue for research may be models that test whether adjustment costs vary over time or across the business cycle, as well as estimation of models that consider the costs of churn or worker replacement in addition to the conventional focus on job creation, job destruction, or aggregate net job flows.

Vb. Job Matching and Employment Dynamics

Numerous studies including Burdett (1978) and Jovanovic (1979) have proposed that worker-employer combinations differ in their productive output, which leads to job switching in the labor market, and the cumulative effects of this job switching are associated with substantial wage increases over a worker's career, as in Topel and Ward (1992). Changes in the nature of this job matching process can lead to changes in employment dynamics. If the match quality distribution shifts toward having fewer high productivity matches, then there will be less job-to-job mobility. Alternatively, if younger workers obtain better initial matches, then there will be

[20] Strictly speaking, changing the level of capital implies its own adjustment costs. The literature on adjustment costs often distinguishes between adjustment costs for capital and labor, and several studies such as Cooper and Haltiwanger (2006) focus exclusively on capital.

less such mobility and more long-tenure jobs.[21] It may be possible to distinguish between these explanations by examining the careers and tenure patterns of younger workers.

It is critical to note that the declines in employment dynamics are concentrated in recessions. During recessions, lower demand leads to fewer opportunities that are more productive than the existing match. Moscarini and Postel-Vinay (2012) show that the Burdett and Mortensen (1998) wage posting model can produce procyclical gross worker flows and job-to-job flows. Essentially, a decline in productivity will lead larger firms to expend less effort in recruiting relative to small firms, leading to less poaching by more productive firms. However, it is less obvious why there would be a dramatic long-run downward trend in these measures.

There are numerous studies that can help develop an understanding of how changes in the process that generates productive employment relationships relates to declining employment dynamics. Models of productivity enhancement through labor reallocation, such as Jovanovic and Moffitt (1990) and Aghion and Howitt (1994), might help in refining a link between trends in productivity and employment dynamics. In this class of models, changes in the productivity process are heterogeneous across jobs, employers, or sectors, and changes in these relative productivities are associated with labor reallocation. In these models, lower output or demand volatility generate lower employment dynamics. We think recent extensions of the Mortensen and Pissarides (1994) model that include on-the-job search, such as Michau (Forthcoming) and Miyamoto and Takahashi (2011), could be helpful frameworks for further understanding the declines we document.

[21] The literature on the prevalence of long-tenure jobs is summarized by Farber (1999, 2010).

Vc. Uncertainty

Employment dynamics are also a feature of business life cycle models such as Jovanovic (1982). New employers may be unaware of their true productivity, or have only a weak signal of their long-run profitability, and, therefore, may only know their optimal size with some error. The size changes implied by such models are precisely job creation and destruction, which are higher among younger establishments as shown, for example, by Dunne, Roberts, and Samuelson (1989). If there are declines in the sources of uncertainty, then this will lead to lower amounts of employment dynamics within young firms relative to older firms. The LEHD data we analyzed in Table 4 show the opposite – the job creation and job destruction rates for the youngest establishments don't change over time, whereas the declines in job creation and job destruction are roughly the same magnitude for all other age categories. This suggests that an Erickson and Pakes (1995) type framework would be more appropriate, where the uncertainty is not learning about a fixed type but rather learning about investment in the current environment, and the uncertainty has decreased equally amongst all firms except the youngest.

The fact that almost all of the declines in employment dynamics occur during recessions suggests that models emphasizing uncertainty will play a key role in understanding these declines. Recessions are known as period of increasing uncertainty, and both firms and workers become more cautious during economic downturns: firms delay major investments and new hiring, and workers delay changing jobs or quitting without a new job in hand; see Bloom (2009) and Baker, Bloom, and Davis (2013). As promising as these uncertainty models might be for explaining the declining dynamics during recessions, we are still left with the puzzle of why all

the measures of dynamics don't increase during expansions and return to their pre-recessionary levels.[22]

Vd. Changes in the Production Process

Increasing globalization may provide an additional means of explaining the decline in U.S. labor market dynamics. If the sensitivity of U.S. production to demand shocks has been decreasing over time, while the sensitivity of production in other countries has been increasing, this may lead to lower employment dynamics in the U.S. This is a story of the U.S. "exporting" its production volatility and its employment dynamics to other parts of the world. Bergin, Feenstra, and Hanson (2009) provide evidence of this occurring in the production sharing relationship between U.S. manufacturers and Mexican maquiladoras. However, trade may also increase volatility by exposing the U.S. to global production or demand shocks. A cross-country analysis by diGiovanni and Levchenko (2009) suggests that openness to trade is associated with higher output volatility, but this effect is much higher for developing countries than for developed economies such as the U.S. A recent paper by Kurz and Senses (2013) looks directly at the relationship between trade and employment volatility for the U.S. manufacturing sector. The empirical conclusions are nuanced depending upon whether the manufacturing firm is an importer or an exporter, but the bulk of the evidence suggests that U.S. manufacturing firms that are moderate exporters have lower employment volatility, while higher volatility is found among those who are occasional importers, as well as businesses for whom trade is a larger portion of revenue. Overall, this nascent literature suggests that the effects of increasing outsourcing and

[22] We acknowledge that we only have one full expansion (2001:Q4 – 2007:Q4) in our data.

globalization during the past several decades may be an explanation for the secular trend in declining employment dynamics.

A related explanation is the dramatic increase in the temporary help industry. Between 1992 and 1999, this industry grew from 1.15 million employees to 2.61 million employees. The temporary help industry supplies workers to clients' businesses for limited periods of time, and thus one person who might have held many short duration jobs at different employers now can hold one job in the temporary help industry but still do the same work at different physical locations.[23] By definition, this will result in decreased levels of employment dynamics, and is consistent with our finding from the LEHD that short-duration jobs are disappearing. But the problem with the temporary help industry being a leading explanation for declining employment dynamics is the timing and the cyclicality – after rising in the 1990s, employment in this industry has not risen since 2000 and has been procyclical since 2000.

Another change in the production process that has received attention in the literature is evolution in market structure. Davis et al. (2007) give special attention to retail trade, which has exhibited large shifts from single-establishment small firms to national chains. This will lead to declining employment dynamics, since large firms have lower rates of hires, separations, job creation, job destruction, and job-to-job flows than do small firms. Estimating the composition effect of firm size for each industry would provide estimates of these changes in market structure, and could help us understand whether the driving forces underlying our declining dynamics are common across industries or whether they are industry specific.

[23] The best reference on the temporary help industry is Dey, Houseman, and Polivka (2010).

It is possible that changing production processes during the last one to two decades has led to declining seasonality, which could lead to declining employment dynamics. We have tested all our data series for changing seasonal patterns, and we find mixed results. All three CPS series – hires, separations, and job-to-job flows, exhibit statistically significant changes in their seasonal patterns, as does the BED job creation series. For example, the difference between the CPS non-seasonally adjusted third quarter and fourth quarter job-to-job flows in the late 1990s was 1.8 percent (9.0 – 7.2), and this difference has fallen to 0.7 percent in 2010 (4.9 – 4.2). This is evidence that seasonality is diminishing in the CPS job-to-job flows series. However, none of the LEHD nor the JOLTS series shows evidence of changing seasonal patterns, and as a result, we don't view changing seasonal patterns as playing a large role in explaining declining employment dynamics.

Ve. Job- and House-Lock

We would be remiss if we didn't mention job-lock and house-lock as explanations for declining job-to-job mobility. Madrian (1994) defines job lock as workers who keep jobs they would rather leave because they fear losing coverage for preexisting conditions. While evidence for job-lock exists, the magnitude of job-lock would need to be increasing during the past 10 to 15 years, particularly in recessions, in order for it to explain the declines in job-to-job flows that are evident in the LEHD and the CPS data. We are unaware of any empirical evidence on this.

House-lock is defined as homeowners who would like to move but keep living in their current house because their mortgage exceeds the expected sale price of the house. While house-

lock likely has the necessary properties to explain the recessionary declines in employment dynamics documented in this paper, there is little empirical evidence of house-lock preceding the Great Recession and we are unaware of any trends in increasing house-lock that would help explain the long-run secular decline.

V. Conclusions

We have shown that the principal measures of employment dynamics – hires and separations, job creation and destruction, and job-to-job flows – have all declined from the late 1990s to 2010. These declines are concentrated in the recessions of 2001 and 2007-2009, from which the measures never seem to recover fully. Using four different data sources, we conducted a comprehensive accounting exercise to see whether changes in the labor market along various demographic or business characteristics could explain the decline. We found that a few characteristics could explain some of the decline, namely the aging of the population, an increase in the share of the workforce that has a Bachelor's degree, and a shift towards older firms. Some changes, such as the increase in the share of the Hispanic population and the decline in manufacturing, have effects that actually raise the rate of employment dynamics. However, much of the decline remains unexplained based on changes between groups.

Given the inability to explain the decline by shifts in the composition of individual and business characteristics, we explored a few additional methods of explaining the decline. The distribution of establishment-level employment change has been narrowing during the last 10 to 15 years, fully accounting for the decline in job creation and job destruction, yet this narrowing

only explains about a third of the decline in hires and separations. This tells us that the explanation for the decline in hires and separations will be different than the explanation for the decline in job creation and job destruction. We also find that the decline in hires and separations is being driven by the decline in job-to-job flows and the disappearance of short-term jobs in the U.S. economy.

Our motivation of this paper mentioned that declining employment dynamics could be either a good or a bad development for the U.S. labor market. Distinguishing between good or bad will depend upon understanding the source of the decline. For example, declining dynamics might be indicative of increasing adjustment costs, increasing uncertainty, or the loss of "stepping stone" jobs that help young workers begin their careers (all "bad" for the labor market). On the other hand, declining dynamics could be indicative of increasing match quality and the associated rise in wages and tenure ("good" for the labor market). Further empirical research is needed to differentiate amongst these explanations. We also believe that the secular and cyclical patterns of the employment dynamics documented in this paper need to be developed more formally in theoretical models so we can begin to understand the underlying source of the declining dynamics.

References

Abowd, John M., Bryce E. Stephens, Lars Vilhuber, Fredrik Andersson, Kevin L. McKinney, Marc Roemer, and Simon Woodcock. 2009. "The LEHD Infrastructure Files and the Creation of the Quarterly Workforce Indicators." In *Producer Dynamics*, ed. Timothy Dunne, J. Bradford Jensen, and Mark J. Roberts. Chicago, IL: University of Chicago Press.

Abowd, John M. and Lars Vilhuber. 2011. "National Estimates of Gross Employment and Job Flows from the Quarterly Workforce Indicators with Demographic and Industry Detail," *Journal of Econometrics* 161(1): 82-99.

Abraham, Katharine G., John Haltiwanger, Kristin Sandusky, and James R. Spletzer. Forthcoming. "Exploring Differences in Household vs. Establishment Measures of Employment." *Journal of Labor Economics*.

Acemoglu, Daron, and David Autor. 2011. "Skills, Tasks, and Technologies: Implications for Employment and Earnings." In *Handbook of Labor Economics*, edited by Orley Ashenfelter and David Card, pp. 1043-1171, London: Elsevier.

Aghion, Philippe, and Peter Howitt. 1994. "Growth and Unemployment." *Review of Economic Studies* 61(3): 477-494.

Alvarez, Fernando, and Marcel Veracierto. 2001. "Severance Payments in an Economy with Frictions." *Journal of Monetary Economics* 47(3): 477-498.

Autor, David H. 2001. "Wiring the Labor Market." *Journal of Economic Perspectives* 15(1): 25-40.

Baker, Scott R., Nicholas Bloom, and Steven J. Davis. 2013. "Measuring Economic Policy Uncertainty." Unpublished paper, Stanford University.

Barnichon, Regis and Christopher J. Nekarda. 2012. "The Ins and Outs of Forecasting Unemployment: Using Labor Force Flows to Forecast the Labor Market." Unpublished paper, Board of Governors of the Federal Reserve System.

Bergin, Paul R., Robert C. Feenstra, and Gordon H. Hanson. 2009. "Offshoring and Volatility: Evidence from Mexico's Maquiladora Industry." *American Economic Review* 99(4): 1664-1671.

Bjelland, Melissa, Bruce Fallick, John Haltiwanger, and Erika McEntarfer. 2011. "Employer-to-Employer Flows in the United States: Estimates Using Linked Employer-Employee Data." *Journal of Business and Economic Statistics* 29(4): 493-505.

Bloom, Nicholas. 2009. "The Impact of Uncertainty Shocks." *Econometrica* 77(3): 623-685.

Burdett, Kenneth. 1978. "A Theory of Employee Job Search and Quit Rates." *American Economic Review* 68(1): 212-220.

Burdett, Kenneth and Dale Mortensen. 1998. "Wage Differentials, Employer Size, and Unemployment." *International Economic Review* 39(2): 257-273.

Burgess, Simon, Julia Lane, and David Stevens. 2000. "Job Flows, Worker Flows, and Churning." *Journal of Labor Economics* 18(3): 473-502.

Cooper, Russell, and John Haltiwanger. 2006. "On the Nature of Capital Adjustment Costs." *Review of Economic Studies* 73(3): 611-633.

Cooper, Russell, John Haltiwanger, and Jonathan Willis. 2004. "Dynamics of Labor Demand: Evidence from Plant-Level Observations and Aggregate Implications." NBER Working Paper 10297.

Davis, Steven J. 2008. "The Decline of Job Loss and Why it Matters." *American Economic Review Papers and Proceedings* 98(2): 263-267.

Davis, Steven J., R. Jason Faberman, and John C. Haltiwanger. 2006. "The Flow Approach to Labor Markets, Micro-Macro Links, and the Recent Downturn." *Journal of Economic Perspectives* 20(3): 3-26.

Davis, Steven J., R. Jason Faberman, and John C. Haltiwanger. 2012. "Labor Market Flows in the Cross Section and over Time." *Journal of Monetary Economics* 59(1): 1-18.

Davis, Steven, Jason Faberman, John Haltiwanger, Ron Jarmin, and Javier Miranda. 2010a. "Business Volatility, Job Destruction and Unemployment." *American Economic Journal: Macroeconomics* 2(2): 259-287.

Davis, Steven J., R. Jason Faberman, John C. Haltiwanger, and Ian Rucker. 2010b. "Adjusted Estimates of Worker Flows and Job Openings in JOLTS." In *Labor in the New Economy*, ed. Katharine G. Abraham, James R. Spletzer, and Michael J. Harper. Chicago, IL: University of Chicago Press.

Davis, Steven, John Haltiwanger, Ron Jarmin, and Javier Miranda. 2007. "Volatility and Dispersion in Business Growth Rates: Publicly Traded and Privately Held Firms." In *NBER Macroeconomics Annual*, Volume 21, ed. Daron Acemoglu, Kenneth Rogoff, and Michael Woodford. Cambridge MA: MIT Press.

Davis, Steven J., John C. Haltiwanger, and Scott Schuh. 1996. "Job Creation and Destruction." MIT Press: Cambridge MA.

Decker, Ryan, John Haltiwanger, Ron Jarmin, and Javier Miranda. 2012. "The Secular Decline in Business Dynamism in the U.S." Unpublished paper, University of Maryland.

Dey, Matthew, Susan Houseman, and Anne Polivka. 2010. "What Do We Know About Contracting Out in the United States? Evidence from Household and Establishment Surveys." In *Labor in the New Economy*, ed. Katherine Abraham, James Spletzer, and Michael Harper. Chicago, IL: University of Chicago Press.

di Giovanni, Julian and Andrei A. Levchenko. 2009. "Trade Openness and Volatility," *Review of Economics and* Statistics 91(3): 558-585.

Dube, Arindrajit, Eric Freeman, and Michael Reich. 2010. "Employee Replacement Costs." UC Berkeley Institute for Research on Labor and Employment Working Paper 201-10.

Dunne, Timothy, Mark Roberts, and Larry Samuelson. 1989. "The Growth and Failure of U.S. Manufacturing Plants." *Quarterly Journal of Economics* 104(4): 671-698.

Elsby, Michael W.L., Ryan Michaels, and Gary Solon. 2009. "The Ins and Outs of Cyclical Unemployment." *American Economic Journal: Macroeconomics* 1(1): 84-110.

Ericson, Richard, and Ariel Pakes. 1995. "Markov Perfect Industry Dynamics: A Framework for Empirical Work," *Review of Economic Studies* 62(1): 53-82.

Fallick, Bruce and Charles Fleischman. 2004. "Employer-to-Employer Flows in the U.S. Labor Market: The Complete Picture of Gross Worker Flows." Finance and Economics Discussion Series 2004-34. Washington: Board of Governors of the Federal Reserve System, http://www.federalreserve.gov/pubs/feds/2004/200434/200434pap.pdf.

Farber, Henry. 1999. "Mobility and Stability: The Dynamics of Job Change in Labor Markets," *Handbook of Labor Economics*, Volume 3B, ed. Orley Ashenfelter and David Card. London: Elsevier.

Farber, Henry. 2010. "Job Loss and the Decline of Job Security in the United States." In *Labor in the New Economy*, ed. Katherine Abraham, James Spletzer, and Michael Harper. Chicago, IL: University of Chicago Press.

Foster, Lucia, John Haltiwanger, and C.J. Krizan. 2001. "Aggregate Productivity Growth: Lessons from Microeconomic Evidence." In *New Directions in Productivity Analysis*, edited by Edward Dean, Michael Harper, and Charles Hulten, University of Chicago Press.

Fujita, Shigeru. 2012. "Declining Labor Turnover and Turbulence." Federal Reserve Bank of Philadelphia Working Paper No. 11-44/R.

Hall, Robert. 2004. "Measuring Factor Adjustment Costs." *Quarterly Journal of Economics* 119(3): 899-927.

Haltiwanger, John, Ron Jarmin, and Javier Miranda. 2011. "Historically Large Decline in Job Creation from Startup and Existing Firms in the 2008–2009 Recession." Statistical Brief for the Kauffman Foundation, http://www.kauffman.org/uploadedFiles/bds_report_3-22-11.pdf.

Hopenhayn, Hugo, and Richard Rogerson. 1993. "Job Turnover and Policy Evaluation: A General Equilibrium Analysis." *Journal of Political Economy* 101(5): 915-938.

Hyatt, Henry and Erika McEntarfer. 2012a. "Job-to-Job Flows in the Great Recession." *American Economic Review Papers and Proceedings* 102(3): 580-583.

Hyatt, Henry and Erika McEntarfer. 2012b. "Job-to-Job Flows and the Business Cycle." Unpublished paper, U.S. Census Bureau.

Jaimovich, Nir, and Henry Siu. 2012. "The Trend is the Cycle: Job Polarization and Jobless Recoveries. NBER Working Paper No. 18334.

Jovanovic, Boyan. 1979. "Job Matching and the Theory of Turnover." *Journal of Political Economy* 87(5): 972-990.

Jovanovic, Boyan. 1982. "Selection and the Evolution of Industry." *Econometrica* 50(3): 649-670.

Jovanovic, Boyan and Robert Moffitt. 1990. "An Estimate of a Sectoral Model of Labor Mobility." *Journal of Political Economy* 98(4): 827-852.

Kambourov, Gueorgui and Iourii Manovskii. 2008. "Rising Occupational and Industry Mobility in the United States: 1968-97." *International Economic Review* 49(1): 41-79.

Kaplan, Greg and Sam Schulhofer-Wohl. 2012. "Understanding the Long-Run Decline in Interstate Migration." NBER Working Paper No. 18507.

Konigsberg, Sheryl L., James R. Spletzer, and David M. Talan. 2009. "Business Employment Dynamics: Tabulations by Size of Employment Change." *Monthly Labor Review* 132(4): 19-29.

Kurz, Christopher and Mine Z. Senses. 2013. "Trading Firms and Volatility." Unpublished paper, Board of Governors of the Federal Reserve.

Lazear, Edward P. and James R. Spletzer. 2012. "Hiring, Churn, and the Business Cycle." *American Economic Review Papers and Proceedings* 102(3): 575-579.

Lentz, Rasmus and Dale T. Mortensen. 2008. "An Empirical Model of Growth through Product Innovation." *Econometrica* 76(6): 1317-1373.

MacLeod, W. Bentley. 2011. "Great Expectations: Law, Employment Contracts, and Labor Market Performance." *Handbook of Labor Economics* 4. 1591-1696.

Madrian, Brigette. 1994. "Employment-Based Health Insurance and Job Mobility: Is there Evidence of Job Lock?" *Quarterly Journal of Economics* 109(1): 27-54.

Manning, Alan. 2006. "A Generalized Model of Monopsony." *Economic Journal* 116(508): 84-100.

Manning, Alan. 2011. "Imperfect Competition and the Labour Market." In *Handbook of Labor Economics*, edited by Orley Ashenfelter and David Card, pp. 973-1041, London: Elsevier.

Michau, Jean-Baptiste. Forthcoming. "Creative Destruction with On-the-Job Search." *Review of Economic Dynamics*.

Miyamoto, Hiroaki and Yuya Takahashi. 2011. "Productivity Growth, On-the-Job Search, and Unemployment. *Journal of Monetary Economics* 58(6): 666-680.

Mortensen, Dale, and Christopher Pissarides. 1994. "Job Creation and Job Destruction in the Theory of Unemployment." *Review of Economic Studies* 61(3): 397-415.

Moscarini, Guiseppe and Kaj Thomsson. 2007. "Occupational and Job Mobility in the US." *Scandinavian Journal of Economics* 109(4): 807-836.

Moscarini, Guiseppe and Fabien Postel-Vinay. 2012. "Stochastic Search Equilibrium." Unpublished manuscript, Yale University.

Shimer, Robert. 2012. "Reassessing the Ins and Outs of Unemployment." *Review of Economic Dynamics* 15, pp. 127-148.

Topel, Robert H. and Michael P. Ward. 1992. "Job Mobility and the Careers of Young Men." *Quarterly Journal of Economics* 107(2): 439-479.

Table 1: The Recent Decline in Employment Dynamics, 1998-2010*

Measure	Definition	Source	Rate in 1998*	Rate in 2010	Proportionate Decline
Hires	New employer-employee matches	LEHD	28.1%	18.7%	*-38%*
		JOLTS*	14.1%	10.6%	*-28%*
		CPS	19.4%	17.3%	*-11%*
Separations	Ending employer-employee matches	LEHD	26.6%	18.5%	*-36%*
		JOLTS*	14.3%	10.1%	*-34%*
		CPS	19.1%	17.2%	*-10%*
Job Creation	Employment growth at new and expanding establishments	LEHD	7.7%	5.5%	*-33%*
		BED	8.3%	6.6%	*-23%*
Job Destruction	Employment decline at contracting and exiting establishments	LEHD	6.4%	5.1%	*-23%*
		BED	7.6%	6.1%	*-22%*
Job-to-Job flows	Direct worker movements between jobs	LEHD	9.9%	6.1%	*-47%*
		CPS	7.9%	4.6%	*-53%*

Notes: LEHD data on hires, separations, job creation, and job destruction for 30 states were downloaded from the Cornell Virtual RDC. LEHD data on job-to-job flows are from Hyatt and McEntarfer (2012) and are available upon request. JOLTS national monthly data were downloaded from the BLS website and converted to a quarterly frequency. BED national data were downloaded from the BLS website. CPS national monthly data were downloaded from the Federal Reserve website and converted to a quarterly frequency. 1998 refers to 1998:Q2, 2010 to 2010:Q4, except for JOLTS data, as noted below. All data are seasonally adjusted. Proportionate declines from date A to B are calculated according to 100*(B-A)/((A+B)/2).

* Due to data availability, the initial JOLTS rate refers to 2001:Q1 rather than 1998.

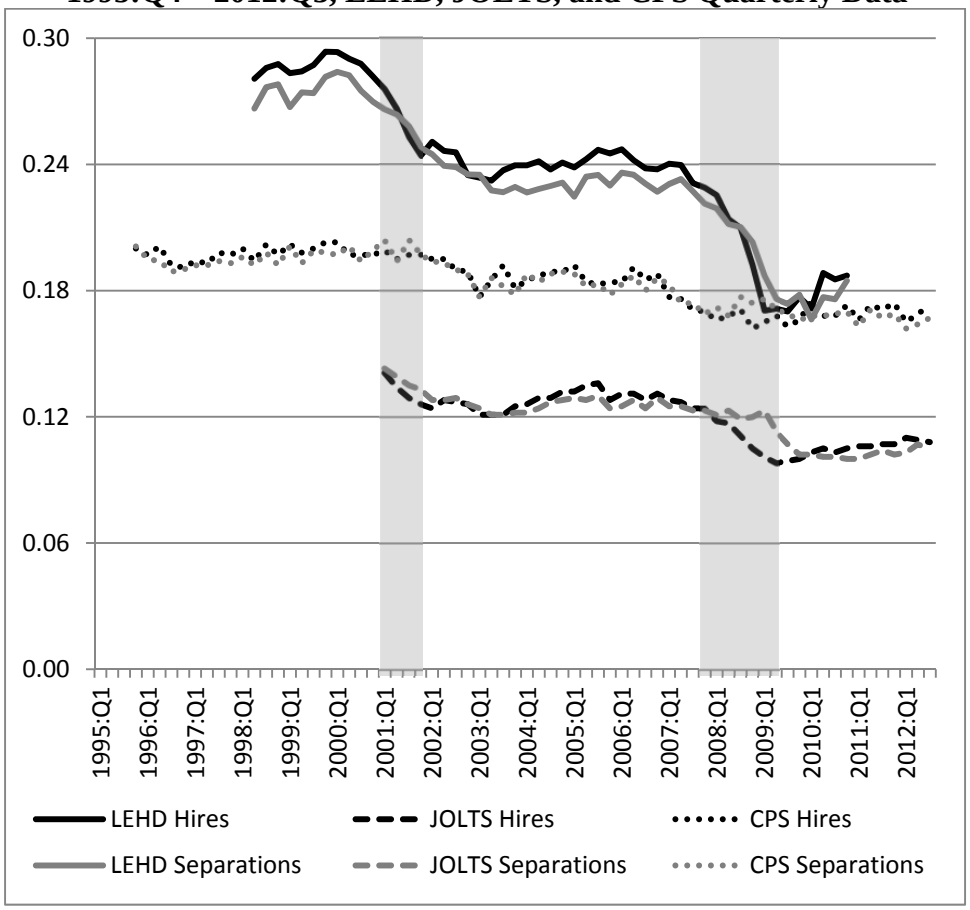
Table 2: Sources of Quarterly Data on Employment Dynamics

	LEHD	CPS	JOLTS	BED
Acronym	Longitudinal Employer-Household Dynamics	Current Population Survey	Job Openings and Labor Turnover Survey	Business Employment Dynamics
Data source for Hires and Separations	Quarterly Workforce Indicators accessed via http://www2.vrdc.cornell.edu/	http://www.federalreserve.gov/pubs/feds/2004/200434/200434abs.html	http://www.bls.gov/jlt	N.A.
Data source for Job-to-Job Flows	Data are from Hyatt and McEntarfer (2012). We use within-quarter and adjacent-quarter flows that involve a separation from the origin employer and a hire at the destination employer.	http://www.federalreserve.gov/pubs/feds/2004/200434/200434abs.html	N.A.	N.A.
Data source for Job Creation and Job Destruction	Quarterly Workforce Indicators accessed via http://www2.vrdc.cornell.edu/	N.A.	N.A.	http://www.bls.gov/bdm
Special Note		Data by demographics and industry were kindly given to us by Bruce Fallick	JOLTS data by establishment size are available upon request from the BLS	Establishment level data are different than firm level data
Geography	Hires, separations, job creation, and job destruction from 30 states.[1] Job-to-job flows are from a sample of individuals who ever worked in at least 1 of 9 states, with their employment histories tracked through all available states.[2]	National	National	National
Frequency	Quarterly	Monthly, converted to quarterly	Monthly, converted to quarterly	Quarterly
Are source data seasonally adjusted?	No for hires, separations, job creation, and job destruction. Yes for job-to-job flows.	No	Yes	Yes
Includes government?	No for hires, separations, job creation, and job destruction. State and local government included in job-to-job flows.	Yes	No	No
Denominator used to calculate rates	For hires, separations, job creation, and job destruction: the average employment in the two quarters. For job-to-job flows, the quarter's total count of dominant jobs.	Employment in the first month of the flow	Current employment	Average employment in the two quarters

[1] These 30 states are: CA, CO, CT, FL, GA, HI, ID, IL, IN, KS, LA, MD, ME, MN, MO, MT, NC, ND, NJ, NM, NV, PA, RI, SC, SD, TN, TX, VA, WA, and WV.

[2] These 9 states are: CA, FL, GA, IL, KS, MI, NV, NC, and ND.

Figure 1: Hires and Separations
1995:Q4 – 2012:Q3, LEHD, JOLTS, and CPS Quarterly Data



Notes: LEHD data for 30 states were downloaded from the Cornell Virtual RDC. JOLTS national monthly data were downloaded from the BLS website and converted to a quarterly frequency. CPS national monthly data were downloaded from the Federal Reserve website and converted to a quarterly frequency. All data are seasonally adjusted.

Table 3: Hires and Separations
Decomposition by Individual and Business Characteristics
2001:Q1 – 2010:Q4, LEHD, JOLTS, and CPS Quarterly Data

	LEHD Hires	LEHD Separations	JOLTS Hires	JOLTS Separations	CPS Hires	CPS Separations
2001:Q1	.276	.266	.141	.143	.199	.204
2010:Q4	.187	.185	.106	.101	.173	.172
Change	-.089	-.081	-.035	-.042	-.026	-.032
% of change explained by changing individual characteristics:						
Age[1]	12.6%	11.2%			23.3%	15.0%
Gender[2]	0.2%	0.2%			-0.3%	-0.3%
Race - Ethnicity[3]	-1.8%	-1.7%				
Education[4]	-0.4%	-0.4%			23.2%	25.4%
% of change explained by changing business characteristics:						
Industry[5]	-6.3%	-5.8%	-2.6%	-1.4%	-4.4%	-3.5%
Firm Size[6]	2.4%	2.3%				
Estab Size[7]			-0.7%	-0.7%		
Firm Age[8]	8.4%	7.5%				

Notes: LEHD data for 30 states were downloaded from the Cornell Virtual RDC. JOLTS national monthly data by industry were downloaded from the BLS website and converted to a quarterly frequency. JOLTS national monthly data by establishment size are available upon request from BLS. CPS national monthly data were downloaded from the Federal Reserve website and converted to a quarterly frequency. CPS data by demographic and business characteristics were provided by Bruce Fallick. All data are seasonally adjusted.

[1] Age has 6 categories: {<24, 25-34, 35-44, 45-54, 55-64, 65+}.

[2] Gender has 2 categories: {male, female}.

[3] Race & Ethnicity has 5 categories: {Asian non-Hispanic, Black non-Hispanic, White non-Hispanic, Other non-Hispanic, Hispanic}.

[4] Education has 4 categories: {less than high school, high school graduate, some college, college graduate}. The education sample is restricted to persons aged 25+.

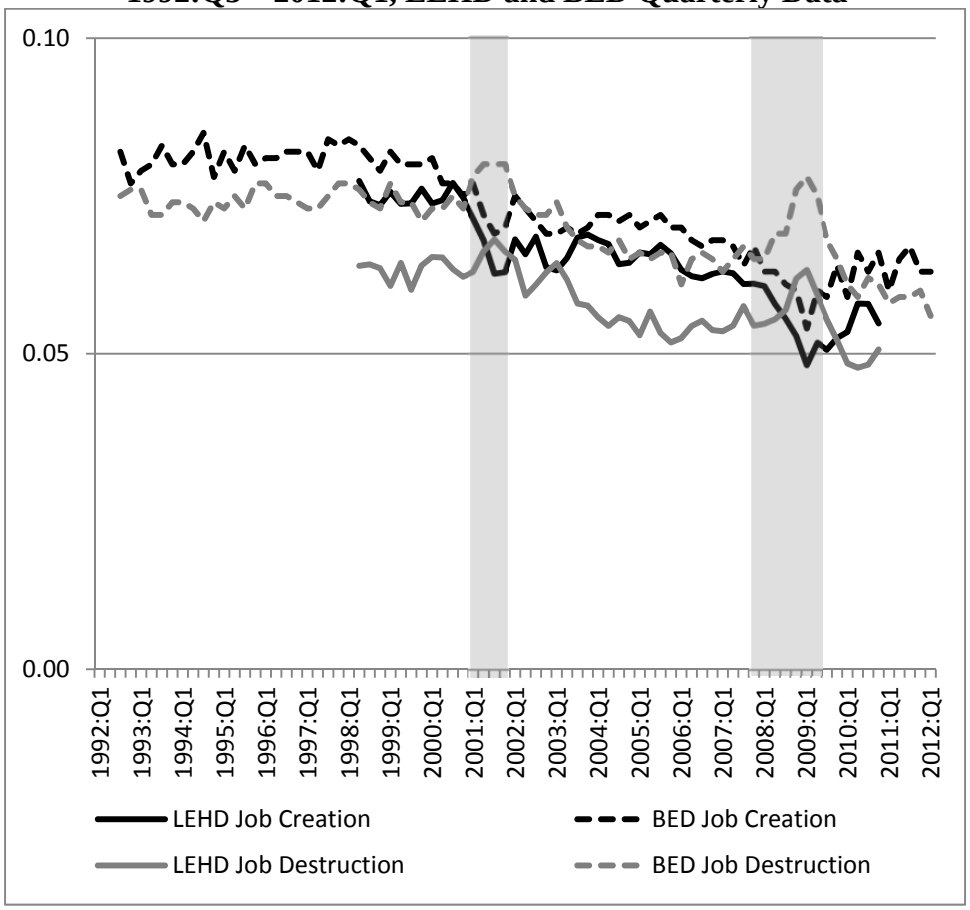
[5] Industry has 11 categories: {Mining, Construction, Manufacturing, Wholesale & Retail Trade, Transportation and Utilities, Information, Financial Activities, Professional and Business Services, Education & Health Services, Leisure and Hospitality Services, Other Services}.

[6] Firm Size has 5 categories: {<20, 20-49, 50-249, 250-499, $\geq$500}.

[7] Establishment Size has 3 categories: {1-49, 50-249, $\geq$250}.

[8] Firm Age has 5 categories: {0-1, 2-3, 4-5, 6-10, 11+}.

Figure 2: Job Creation and Job Destruction
1992:Q3 – 2012:Q1, LEHD and BED Quarterly Data



Notes: LEHD data for 30 states were downloaded from the Cornell Virtual RDC. BED national data were downloaded from the BLS website. All data are seasonally adjusted.

Table 4: Job Creation and Job Destruction Decomposition by Business Characteristics 1998:Q2 – 2010:Q4, LEHD and BED Quarterly Data

	LEHD Job Creation	LEHD Job Destruction	BED Job Creation	BED Job Destruction
1998:Q2	.077	.064	.083	.076
2010:Q4	.055	.051	.066	.061
Change	-.022	-.013	-.017	-.015
% of change explained by changing business characteristics:				
Industry[1]	-7.2%	-9.7%	-9.0%	-5.9%
Firm Size[2]	9.6%	13.1%	5.8%	6.3%
Firm Age[3]	18.9%	14.4%		

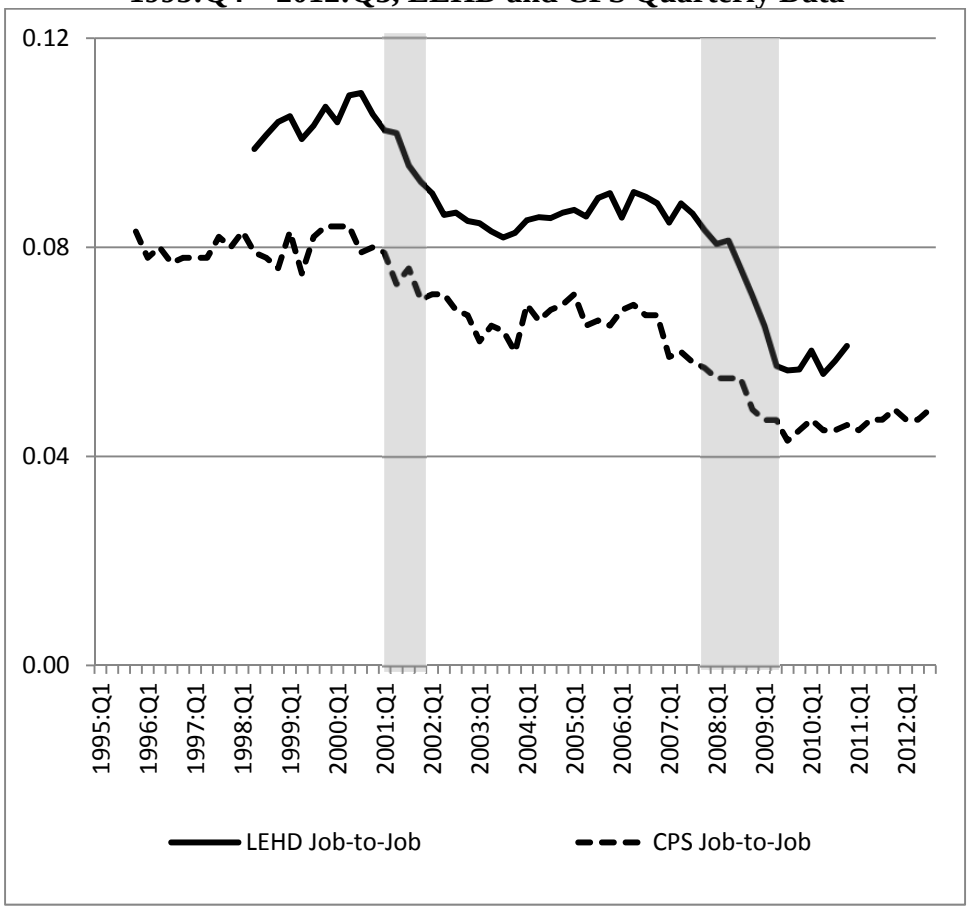
LEHD data for 30 states were downloaded from the Cornell Virtual RDC. BED national data were downloaded from the BLS website. BED establishment level data are different than BED firm level data; the BED job creation and job destruction statistics in the top rows of this table are national establishment level data. BED data for 30 states were downloaded from the BLS website for the state decomposition. All data are seasonally adjusted.

[1] Industry has 12 categories: {Agriculture and Mining, Construction, Manufacturing, Wholesale Trade, Retail Trade, Transportation and Utilities, Information, Financial Activities, Professional and Business Services, Educational and Health Care Services, Leisure and Hospitality, Other Services}.

[2] Firm Size has 5 categories: {<20, 20-49, 50-249, 250-499, $\geq$500}.

[3] Firm Age has 5 categories: {0-1, 2-3, 4-5, 6-10, 11+}.

Figure 3: Job-to-Job Flows
1995:Q4 – 2012:Q3, LEHD and CPS Quarterly Data



Notes: LEHD data are from Hyatt and McEntarfer (2012). CPS national monthly data were downloaded from the Federal Reserve website and converted to a quarterly frequency. All data are seasonally adjusted.

Table 5: Job-to-Job Flows
Decomposition by Individual and Business Characteristics
1998:Q2 – 2010:Q4, LEHD and CPS Quarterly Data

	LEHD Job-to-Job	CPS Job-to-Job
1998:Q2	.099	.079
2010:Q4	.061	.046
Change	-.038	-.033
% of change explained by changing individual characteristics:		
Age[1]	21.0%	9.0%
Gender[2]	0.3%	0.0%
Race & Ethnicity[3]	-0.6%	
Education[4]	-0.2%	2.9%
% of change explained by changing business characteristics:		
Industry[5]	-1.3%	-1.1%
Firm Size[6]	2.8%	
Firm Age[7]	7.6%	

Notes: LEHD data are from Hyatt and McEntarfer (2012). CPS national monthly data were downloaded from the Federal Reserve website and converted to a quarterly frequency. CPS data by demographic and business characteristics were provided by Bruce Fallick. All data are seasonally adjusted.

[1] Age has 6 categories: {<24, 25-34, 35-44, 45-54, 55-64, 65+}.

[2] Gender has 2 categories: {male, female}.

[3] Race & Ethnicity has 5 categories: {Asian non-Hispanic, Black non-Hispanic, White non-Hispanic, Other non-Hispanic, Hispanic}.

[4] Education has 4 categories: {less than high school, high school graduate, some college, college graduate}. The education sample is restricted to persons aged 25+.

[5] Industry has 11 categories: {Mining, Construction, Manufacturing, Wholesale & Retail Trade, Transportation and Utilities, Information, Financial Activities, Professional and Business Services, Education & Health Services, Leisure and Hospitality Services, Other Services}..

[6] Firm Size has 5 categories: {<20, 20-49, 50-249, 250-499, $\underline{>}$500}.

[7] Firm Age has 5 categories: {0-1, 2-3, 4-5, 6-10, 11+}.

Table 6: Gross Worker and Job Flows in the LEHD

LEHD	1998:Q2	2010:Q4	Change	Percent of H+S Change
H	.281	.187		
S	.266	.185		
JC	.077	.055		
JD	.064	.051		
H+S	.547	.372	-.175	
JC+JD	.141	.106	-.035	20.0%
2*Churn	.406	.266	-.140	80.0%

Notes: LEHD data on hires, separations, job creation, and job destruction for 30 states were downloaded from the Cornell Virtual RDC. All data are seasonally adjusted.

Table 7: Gross Worker and Job Flows from Lazear and Spletzer (2012)

Lazear and Spletzer JOLTS	2001:Q1	2010:Q4	Change	Percent of H+S Change
H	.110	.087		
S	.113	.083		
JC	.036	.037		
JD	.039	.033		
H+S	.222	.170	-.052	
JC+JD	.075	.070	-.005	9.6%
2*Churn	.147	.100	-.047	90.4%

Notes: Hires, separations, job creation, and job destruction data are from Lazear and Spletzer's (2012) analysis of the JOLTS microdata.

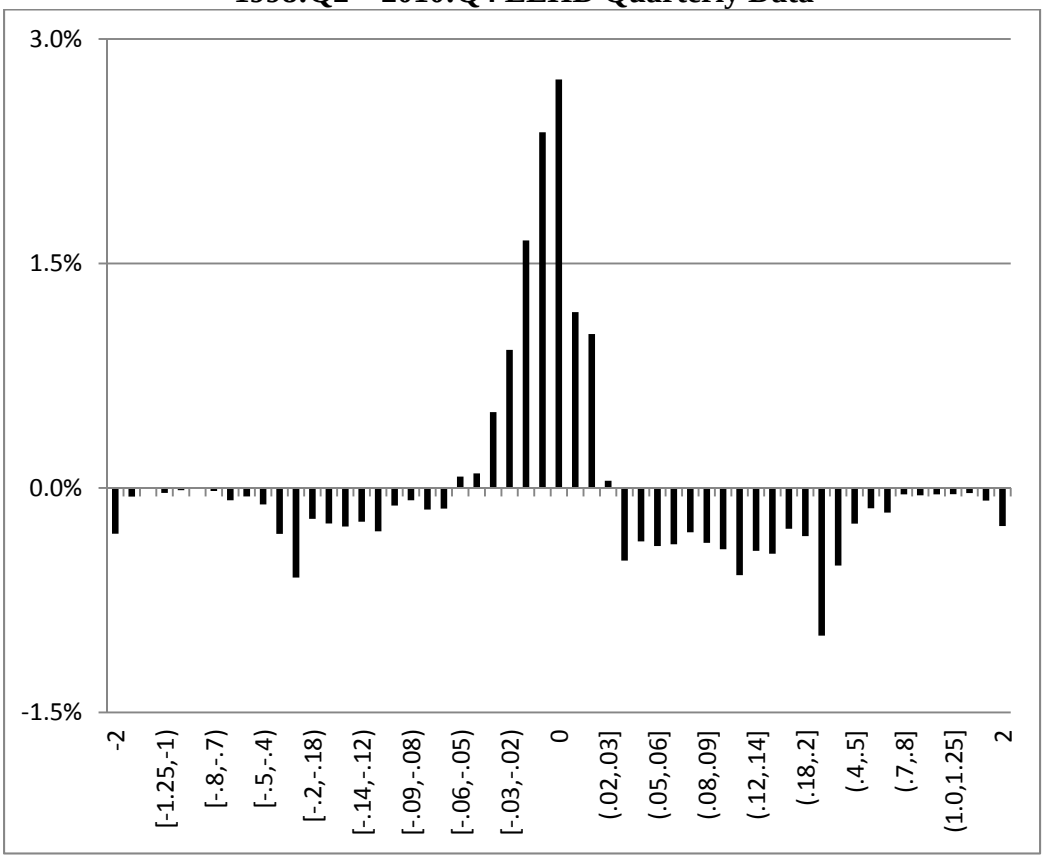
Table 8: Employment Dynamics
Decomposition by Business Characteristics
1998:Q2 – 2010:Q4, LEHD Quarterly Data

	Job Creation	Job Destruction	Hires	Separations
1998:Q2	.072	.065	.267	.260
2010:Q4	.052	.052	.175	.175
Change	-.020	-.013	-.092	-.084
% of change explained by changing business characteristics:				
Emp Growth[1]	99.8%	100.3%	37.3%	32.0%

Notes: LEHD data on hires, separations, job creation, and job destruction were created from confidential LEHD microdata. All data are seasonally adjusted.

[1] Employment Growth "g" has 55 categories: {-2, (-2.0,-1.5), [-1.5,-1.25), [-1.25,-1), [-1,-.9), …, [-.3,-.2), [-.2,-.18), …, [-.12,-.1), [-.1,-.09), …, [-.01,0), 0, (0, .01], …, (.09,.1], (.1,.12], …, (.18,.2], (.2,.3], …, (.9,1], (1,1.25], (1.25,1.5], (1.5,2), 2}.

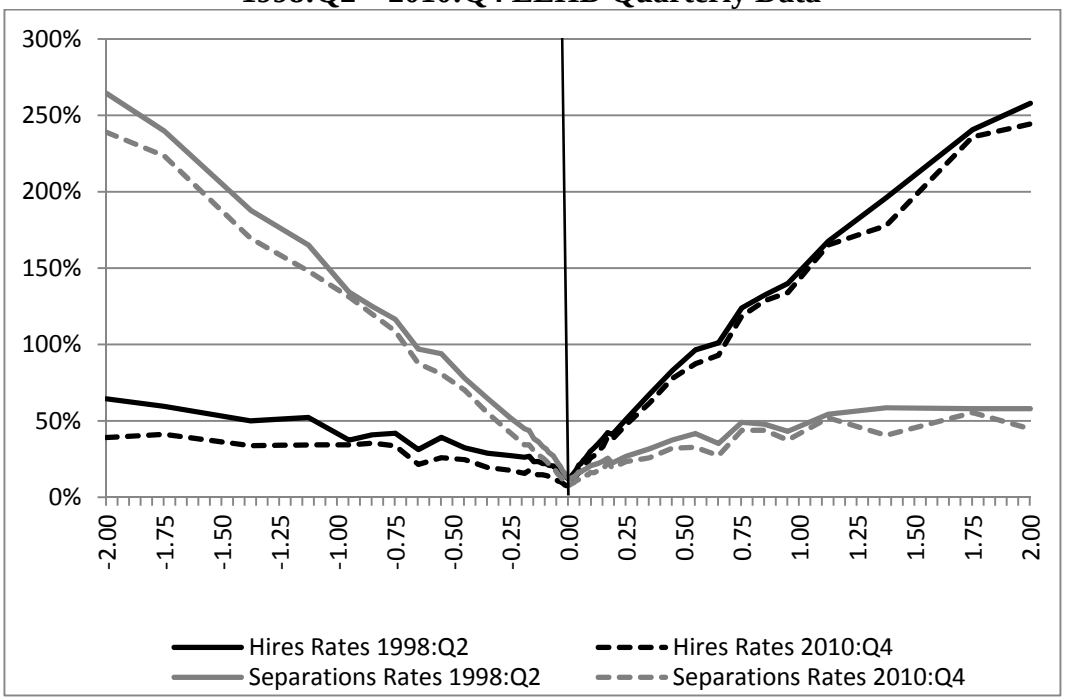
Figure 4: Change in Employment Share (vertical axis), by the Establishment's Growth Rate Distribution g (horizontal axis) 1998:Q2 – 2010:Q4 LEHD Quarterly Data

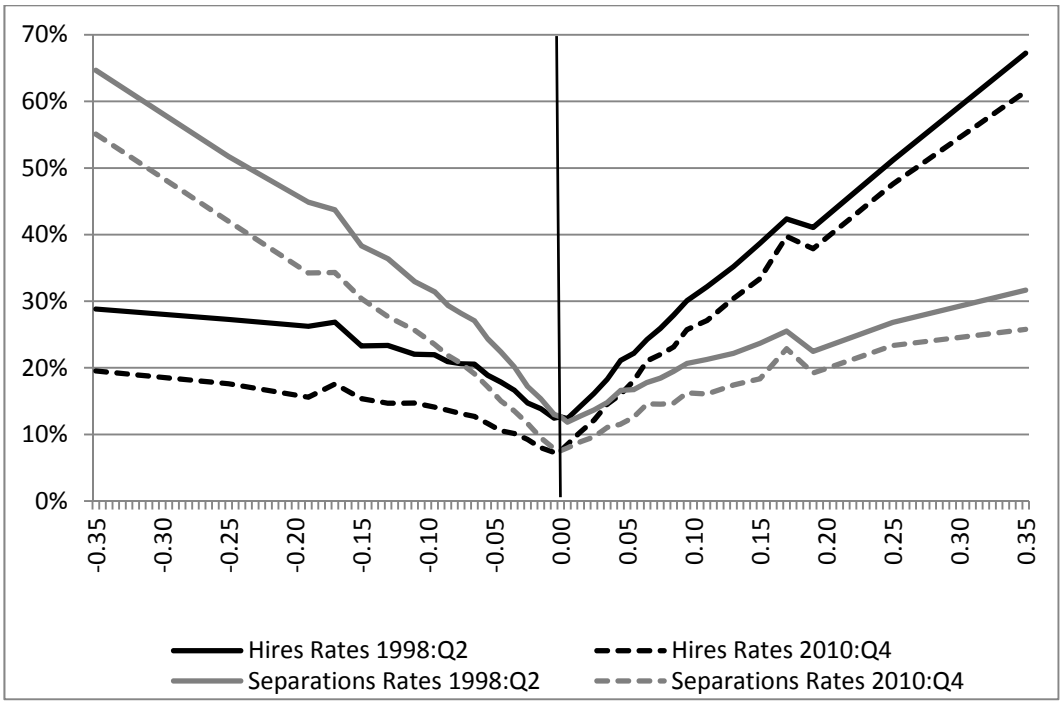


Notes: LEHD data on hires, separations, job creation, and job destruction were created from confidential LEHD microdata. All data are seasonally adjusted.

[1] Employment Growth "g" has 55 categories: {-2, (-2.0,-1.5), [-1.5,-1.25), [-1.25,-1), [-1,-.9), …, [-.3,-.2), [-.2,-.18), …, [-.12,-.1), [-.1,-.09), …, [-.01,0), 0, (0, .01], …, (.09,.1], (.1,.12], …, (.18,.2], (.2,.3], …, (.9,1], (1,1.25], (1.25,1.5], (1.5,2), 2}.

Figure 5: Hires and Separations (vertical axis), by the Establishment's Growth Rate Distribution g (horizontal axis) 1998:Q2 – 2010:Q4 LEHD Quarterly Data





Notes: LEHD data on hires, separations, job creation, and job destruction were created from confidential LEHD microdata. All data are seasonally adjusted.

Table 9: Gross Worker Flows and Job-to-Job Flows in the CPS

CPS	1998:Q2	2010:Q4	Change	Percent of H+S Change
H	.194	.173		
S	.191	.172		
Job-to-Job	.079	.046		
H+S	.385	.345	-.040	
In+Out	.227	.253	.026	-65%
2*J-to-J	.158	.092	-.066	165%

Notes: CPS national monthly data were downloaded from the Federal Reserve website and converted to a quarterly frequency. All data are seasonally adjusted.

Table 10: Gross Worker Flows and Job-to-Job Flows in the LEHD

LEHD	1998:Q2	2010:Q4	Change	Percent of H+S Change
H	.281	.187		
S	.266	.185		
Inflows	.061	.044		
Outflows	.053	.049		
Job-to-Job	.099	.061		
H+S	.547	.372	-.175	
In+Out	.114	.093	-.021	12.0%
2*Job-to-Job	.198	.122	-.076	43.4%
Residual Secondary and Short Term Jobs	.235	.157	-.078	44.6%

Notes: LEHD data for 30 states were downloaded from the Cornell Virtual RDC to create rates of hires and separations. LEHD job-to-job flows data are from Hyatt and McEntarfer (2012). Inflow and outflow rates were calculated as a special tabulation from the job-to-job flows database. All data are seasonally adjusted.

Table 11: Gross Worker Flows in the LEHD

LEHD	1998:Q4	2010:Q3	Change	Percent of H+S Change
H	.288	.185		
H Single Quarter Jobs	.114	.060		
H Two Quarter Jobs	.067	.041		
H Three+ Quarter Jobs	.107	.084		
S	.278	.176		
S Single Quarter Jobs	.114	.060		
S Two Quarter Jobs	.063	.037		
S Three+ Quarter Jobs	.101	.079		
H+S	.566	.361	-.205	
H+S Single Quarter Jobs	.228	.120	-.108	52.7%
H+S Two Quarter Jobs	.130	.078	-.052	25.4%
H+S Three+ Quarter Jobs	.208	.163	-.045	22.0%

Notes: LEHD data for 30 states were downloaded from the Cornell Virtual RDC. All data are seasonally adjusted.